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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Fukuda et al.	) Group Art Unit 1763
Appl. No.	:	09/511,934	)
Filed	:	February 24, 2000	)
For	:	THIN-FILM FORMING APPARATUS HAVING AN AUTOMATIC CLEANING FUNCTION FOR CLEANING THE INSIDE	)
Examiner	:	R. Kackar	)

SUPPLEMENTAL DECLARATION UNDER RULE 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Kiyoshi Satoh, a co-inventor of the above-identified application do hereby declare as follows:

1 I am the declarant of the previously submitted Declaration under Rule 1.132 dated March 19, 2003 ("March Declaration").

2 As I stated in the March Declaration, the experiments described in the March Declaration were conducted in accordance with the example described in the present specification. The conditions were described in the present specification. All of the experiments shown in the March Declaration were conducted under the same conditions, except for the cleaning temperatures. Thus, the differences in the results resided in the differences in cleaning temperature. I isolated the effect of cleaning temperature.

3 One condition which was not known from the March Declaration is the temperature of the showerhead during the cleaning processes. The temperature of the showerhead was constantly about 120°C during all of the cleaning processes.

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4 The results of the experiments are consistent with my findings which are described in the specification (page 4, first paragraph): 1) When the temperature exceeds 470°C, even aluminum nitride reacts with fluorine active species to generate aluminum fluoride, 2) when the surface temperature of a heater exceeds 500°C, generation and emission of aluminum fluoride occurs and causes damage to a reaction chamber, and 3) aluminum fluoride emitted from the heater adheres to a showerhead of relatively low temperature (100-250°C).

5 In a cleaning environment, the reactions or phenomena 1), 2), and 3) depend on the temperature. At a temperature of 470°C, the reaction between aluminum nitride (heater surface) and fluorine active species (cleaning gas) can fully be suppressed, thereby preventing generation of aluminum fluoride. Because no aluminum fluoride is generated at 470°C, even on a showerhead surface having a low temperature, no accumulation of aluminum fluoride may be observed.

6 The experiments in the March Declaration shows that when cleaning was conducted at 470°C, no trace of wiping was shown, indicating no degree of accumulation of particles. Further, this surprising effect was substantiated by the second experiment showing that when cleaning was conducted at 470°C, because of no accumulation of particles on the showerhead, the film thickness and film stress did not change even after processing 2,000 wafers.

7 I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Dated: August 21, 2003

By: C Satoh